

REMARKS

Claims 1-12 are in the application and under consideration. Applicant appreciates the Examiner's careful attention to the application. The objections to the drawings, specification and claims are believed obviated by the above amendments and the drawing change submitted in a separate paper herewith.

Section 102 Rejection

The rejection of Claims 1-4 and 7 under 35 U.S.C. §102(b) as being anticipated by Shaffer is believed obviated by the above amendments and respectfully traversed for the following reasons.

The presently claimed invention of Claim 1 is directed to a socket contact that facilitates the assembly of a pin contact with the socket contact while an electrical potential exists between the pin contact and the socket contact (i.e., "hot plugging") without eroding or melting a conductive element located in the bore of the socket. The conductive element located in the bore improves the electrical connection with the pin contact. The presently claimed invention provides a unique combination of features that provide a more electrically efficient socket contact while facilitating "hot plugging".

The electrical component-attaching section of the socket of the present invention is integrally formed with the receptacle section to prevent electrically resistive joints between the two ends of the socket contact. The bore of the socket has an arc-arresting end portion having a thickness greater than the wall forming the bore and an opening which is smaller in diameter than the pin contact which absorb the initial arc between the pin contact and the socket as they are moved into close contact to preclude arcing between the pin contact and the conductive element located in the bore of the socket. The socket contact also has expansion means for permitting the opening of the arc-arresting end portion to expand as the pin passes into the bore. The expansion means permits the further forcible mating of the pin contact into the socket contact to make contact with the conductive element after the initial mandatory engagement of the pin contact with the arc-

A

arresting end portion.

In contrast, the Shaffer reference is directed to a substantially different electrical contact not disclosing the unique combination of features of the claimed invention. The Shaffer contact is directed to providing a limited insertion force connector, and as such has features in direct opposition to the claimed invention. The socket cavity 18 is defined by the arcuate converging spring contact arms 16. The objective of the Shaffer connector is to reduce the force required to insert the pin into the socket while providing for subsequent effective electrical communication between the pin and the socket after the pin is fully inserted into the connector.

In the Shaffer contact, the subsequent effective electrical communication is achieved by applying substantial contact force with the converging spring contact arms 16 (which form the socket cavity) to the pin contact 40.¹ In contrast, the subsequent effective electrical communication of the claimed invention is provided by the conductive element located in the bore of the socket.

In order to achieve the low insertion force objective, the Shaffer contact uses two features. The converging contact arms 16 (which are the same thickness all along their length from the bottom end 28 to forward end 20) are initially held apart by a compression spring 32 and a cap member 36 so as to be biased away from the pin contact. To further reduce the insertion force, the forward end 20 of the socket has "a formation constituting a lead-in for enabling insertion of pin contact section 46 formed by forward ends of spring contact arms 16 diverging or extending outwardly."² It can be seen from the Shaffer disclosure that not only are the contact arms 16 the same thickness all along their length, they diverge outwardly away from the pin contact to form an opening into socket cavity 18 rather than providing an arc-arresting portion having a

¹ Shaffer, Col. 1, lines 14-20, Col. 2, lines 11-12 and 24-27, and Col. 5, lines 26-31.

² Shaffer, Col. 5, lines 9-12.

greater thickness than the rest of the length of the bore wall and providing an opening into the bore smaller than the outer diameter of the pin contact.

In view of the above remarks, it is respectfully submitted that Claim 1 is allowable over Shaffer. It is also respectfully submitted that Claims 2-4 and 7 are allowable over Shaffer at least for the reasons stated above with respect to Claim 1.

Section 103 Rejection

The rejection of Claims 5, 6 and 8-12 under 35 U.S.C. §103(a) as being unpatentable over Shaffer in view of Puerner is believed obviated by the above amendments and respectfully traversed for the following reasons.

As pointed out above, Shaffer failed to disclose the combination of features of Claim 1 of the present invention which features are in Claims 5, 6 and 8-12. More importantly, it was pointed out that Shaffer disclosed features in direct opposition to the claimed invention, specifically, Shaffer taught biasing the spring contact arms apart and flaring the distal ends of the contact arms to create an opening into the socket that provides a low insertion force connector. Furthermore, the spring contact arms of Shaffer were the same width along their entire width.

It is respectfully submitted that Puerner has the same defect as can be seen in FIGS. 4-8. Further, it is respectfully submitted that Puerner further taught away from the claimed invention in that the distal end (at reference numbers 62 and 77) of the female contact section 58 is thinner than the remainder of the wall forming the female contact section 58 (see FIGS. 3, 4 and 6-8). Therefore, even if the cited references were combined in the alleged manner, the combination failed to teach the features of the present claims. In addition, Puerner further taught away from the claimed invention in that the member 70 is an insulative material for preventing electrical connections with the female contact section 58,³ rather than establishing an electrical connection between the

³ Puerner, Col. 3, lines 30-37 and Col. 3, line 66 through Col. 4, line 2.

pin contact and the socket contact.

The Examiner has correctly noted that Shaffer does not disclose a strip of spring contacts of conductive material located in the cavity of the elastically expandable cylindrical section for providing a more electrically efficient socket contact. The Applicant respectfully disagrees that it would have been obvious to modify Shaffer by replacing the strip 64 and member 70 of Puerner for the member 30. First, it is pointed out that the member 70 is insulative and as such could not establish an electrical connection between the pin contact and the socket contact when the pin nears the opening of the socket. Second, the substitution of strip 64 for member 30 of Shaffer would result in Shaffer being inoperative for its intended purpose because the strip 64 could not operate as a bracing means for holding the spring contact arms 16 apart to lower the insertion force. Thus, it is respectfully submitted that there was no motivation to combine the references in the asserted manner.

In view of the above remarks, it is respectfully submitted that Claims 5, 6 and 8 are allowable over Shaffer in view of Puerner. It is also respectfully submitted that Claims 9-12 are allowable over Shaffer in view of Puerner at least for the reasons stated above with respect to Claim 8.

Other References

It is noted by Applicant that EP401723 discloses a cylindrical contact spring 80 in contact 74 but it is brought to the Examiner's attention that there is no disclosure of an elastically expandable section in the contact 74 and no disclosure of a portion of the contact having a thicker portion than the casing part 76. As seen in FIG. 2, the opening into the contact 74 is thinner than the remainder of the casing part 76. Furthermore, as the translation discloses, the pin section 138 of contact 134 actually contacts metal contact receiver 71 at inner surface 79 of inner ring flange 77. The smallest diameter of the ring flange 77 corresponds to the outer diameter of pin section 138 such that the conical, inner metal surface 79 is used as an insertion aid for the pin. Therefore, the contact unit 71 would make the initial electrical connection, assuming the connector was used for hot-

plugging, not the contact 74.

It is also noted that Japan 0107481 discloses an auxiliary contact protruding portion 4,4 shifted to the initial insert side end part 2c apart from the main contact protruding part 3,3. The spark unavoidably generated by insert and pull out in the electrified state is produced in the auxiliary contact protruding portion 4,4 to prevent loss of contact holding power by the main contact protruding portion 3,3. It is brought to the Examiner's attention that there is no disclosure of a conductive element in the bore of the socket for contacting the pin contact, rather the main contact protruding portion 3,3 of the socket itself contacts the pin contact.

It is also noted that Couper discloses interior projections 52 which provide an interior radial surface of engagement for providing a camming action when engaged with the cam surfaces on portion 38 of the pin 36. The purpose of the projections 52 and cam surfaces 38 is to maintain the proper relationship between the gap S and the outer diameter of the receptacle 44 for proper impedance matching in coaxial cables for high frequency microwave applications. There is no disclosure of a conductive element in the bore for contacting the pin contact, rather the reference discourages such as the reference discusses the importance of maintaining precise spacing in microwave connectors because even small discontinuities have a substantial and adverse effect.


Conclusion

It is respectfully submitted that for the reasons stated above present Claims 1-12 are in condition for allowance, which indication at an early date is respectfully solicited.

Respectfully submitted,

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